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AN OPERATIONAL LEVEL OF WAR FIRE SUPPORT ROLE FOR THE
OPERATIONAL LEVEL COMMANDER(U) ARMY WAR COLL CARLISLE
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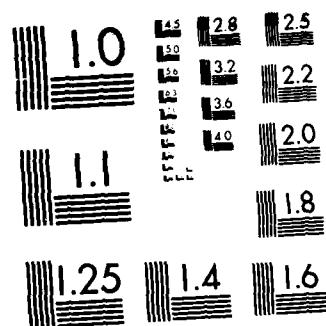
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An Operational Level of War Fire
Support Role for the Operational
Level Commander

An Individual Study Project

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In recent years there has been an increasing emphasis and awareness of the conduct of warfare at the operational level. As a result, the role of the operational level commander has been the focus of much discussion and study. One area, among many, in which the role of the operational level commander is expanding is that of fire support. This study examines the role of this commander in the area of operational fire support, using the Commander Central Army Group as the example. The study will examine the appropriateness of providing operational level commanders with an organization and a deep strike field artillery weapons system to facilitate attack of targets at operational depths. The study provides some background information on concerns posed by the Intermediate Range Nuclear Force Treaty, as well as a discussion of key terms concerning the operational level of war, and operational fires. It also explores the types of targets the operational level commander is interested in attacking, the characteristics of deep attack weapons systems, target acquisition requirements, a proposed fire support organization and command relationships. Finally, the study draws some conclusions and makes recommendations concerning operational fires.

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An Operational Level of War Fire Support Role for
the Operational Level Commander

CHAPTER I

INTRODUCTION

This study will examine the appropriateness of establishing a fire support delivery unit at the operational level of war and equipping it with a deep strike field artillery weapon system. The unit would be assigned an operational level of war fire support role. The idea being to provide operational level commanders, such as the Central Army Group (CENTAG) Commander and the Northern Army Group (NORTHAG) Commander, with an organization and weapons system that will enable them to maintain the highest possible level of deterrence and to execute their operational level fire support responsibilities by attacking critical enemy targets if deterrence should fail.

BACKGROUND

As a direct consequence of the Intermediate Range Nuclear Force (INF) Treaty between the United States and the Soviet Union, the Pershing II missile system and the ground launched cruise missile (GLCM) system will be removed from Europe and destroyed. With the removal of the Pershing II's and the GLCM's concerns

have been raised relating to the North Atlantic Treaty Organization's (NATO) ability to maintain a credible deterrence against Soviet aggression. General Bernard W. Rogers, former supreme allied commander in Europe, stated during recent INF Treaty ratification hearings before the Senate Armed Services Committee that the treaty is extremely damaging to the credibility of NATO's deterrence but the Alliance is now committed to the treaty. He further testified that NATO and the United States must recognize that the credibility of the theater deterrence will never again be as high as with the Pershing II's deployed.¹ General Rogers also told the committee what steps the United States and NATO should take in the post INF period to maintain the strength of the Alliance's military forces. He said that NATO must achieve the weapon modernization objectives established in 1983 by the so called Montebello agreement, which included development and deployment of a modern missile system to replace the aging Lance system.²

General John R. Galvin, the incumbent supreme allied commander in Europe, stated recently in the Washington Post, that the INF treaty carries 'more risk than we ought to be ready to take' unless it is offset by an upgrading of NATO's nuclear and conventional arsenals. He also said that to cover the range area of out to 500 kilometers, not subject to

the terms of the INF treaty, the U.S. should develop and deploy a nuclear capable successor to the Lance battlefield missile.³

Defense Secretary Frank Carlucci has indicated that it is extremely important for the U.S. to proceed with modernization of weapons not specifically banned by the INF Treaty. He has urged the Congress to lift the current restrictions it has imposed on development and deployment of new nuclear missiles in Europe.⁴

Additionally, Secretary Carlucci has indicated that Pentagon weapons planning must give higher developmental priority to high-technology, conventional, smart weapons. He has endorsed a recent NATO report on competitive strategies which calls for the development of a long range, mobile missile system such as the tactical missile system(TACMS) the Army is developing.⁵

Certainly, senior leaders, both military and civilian, believe that NATO needs to develop and deploy in Europe a modernized, mobile and extremely accurate weapons system capable of striking deep at militarily significant targets with both conventional and nuclear warheads. This type of system will help the NATO Alliance to close the so called 'deterrence gap' in the post INF Treaty period.

DOCTRINAL DISCUSSION OF KEY TERMS

For purposes of this study it is important to define the terms operational level of war and operational fires as these terms are key to the study and are sometimes misunderstood. A review of Army Field Manual (FM) 100-5, Operations, and Army Field Manual 100-6, Large Unit Operations, provides insight into what is meant by these terms. FM 100-5 states that the operational art is, "the employment of military forces to attain strategic goals in a theater of war through the design, organization, and conduct of campaigns and major operations." The manual further states that while no particular echelon of command is solely concerned with the operational art usually theater commanders and their chief subordinates plan and direct campaigns and major operations. Army groups and armies normally design the major ground operations and corps and divisions normally execute the operations.* In the NATO central Europe region, Allied Forces Central Europe and its two army groups, CENTAG and NORTHAG, are operational level of war headquarters.

FM 100-6 specifically states that corps and divisions exercise a primarily tactical role in warfare while operational level matters are reserved to the echelons above corps, such as the unified

commands, army groups, and armies. In the execution of operational responsibilities, these high level organizations practice the operational art, which is the employment of military forces to attain strategic goals through the design, organization and execution of campaigns and major operations.⁷ Normally in the NATO environment, the operational level of warfare is conducted at the echelons of command above the corps. Corps and divisions are usually concerned with conducting tactical operations in support of the operational level of war.

U.S. Army Airland Battle doctrine discusses in detail four basic tenets of combat at the operational and tactical levels. They are initiative, agility, depth, and synchronization. The tenet that we are primarily concerned with here is depth because it provides insight into the area of fires and the commander's responsibilities for execution of fires. The tenet of depth means, essentially, that commanders will engage the enemy throughout the enemy formations to the depths at which the targets can be acquired and attacked. Deep fires will degrade the enemy's freedom of action, reduce his combat power, flexibility and alter his carefully computed correlation of forces. Additionally, deep fires will upset his carefully laid plans and disrupt his all important timing and tempo of attack. In the pursuit of operational objectives,

commanders of large units employ fires to attack enemy units, facilities, and communications throughout the theater to force the enemy to engage in combat on their terms.*

FM 100-6 expands on this idea of deep fires. The manual addresses what is called the major operational functions of which there are five. These functions are intelligence, maneuver, fires, sustainment, and deception. These functions allow the operational level commander to influence the outcome of a major operation.* The manual states that operational fires are those fires that constitute a decisive impact on the conduct of a campaign or major operation. Currently, operational fires are largely accomplished using air power; however, as surface delivery systems increase in range, accuracy, and effectiveness, they will play an ever increasing role.¹⁰

The Airland Battle doctrine addresses three arenas in which operations are conducted. These are; close, deep, and rear operations. In deep operations at the operational level, commanders endeavor to isolate the battlefield and influence when, where, and against what enemy forces future combat actions will be executed. They accomplish this by conducting interdiction operations against enemy logistical facilities, reserve forces, follow-on forces, and communications installations in order to limit the

opposing commander's freedom of action and to disrupt the coherence and tempo of his operations.¹¹

The general tasks to be accomplished by operational fires are outlined in FM 100-6. These tasks are to facilitate maneuver, isolation of the battlefield and the destruction of enemy facilities, forces and functions. Specifically, operational fires can include attack of enemy command and control systems, fixed and mobile bridging assets, air defense systems, and long range surface to surface missile systems.¹² Operational fire support systems must be capable of responding to the need to attack, successfully, to a full range of targets, including soft sitting targets and hard moving targets, throughout a commander's area of responsibility.

Operational fires are distinguished from tactical fires by several key points. First of all, operational fires are not designed to support tactical manuevers. Rather, operational fires are actually a coequal component of the overall operational scheme. Because operational fires are not employed in routine support of manuever units, the weapons systems used to execute operational fires will usually be found at the corps level or above. Additionally, planning for employment of operational fires is a top down process, as opposed to the bottom up procedure used when planning tactical fires. The operational commander

establishes objectives and designates targets on which operational level fires will be delivered. Targets are then attacked by units subordinate to the operational level commander.¹³

Based on existing doctrinal evidence it is clear that operational fires are planned and executed at echelons of command above the corps level, specifically at the subunified command army group, or army levels. For operational level commanders to properly discharge operational level responsibilities regarding fires, they must have resources. These resources must be readily available to the commander, and they must be capable of responding to his operational fires' requirements. Ideally, these resources, primarily delivery units and delivery weapon systems, will be under the command and control of the operational level commander giving him the capability to engage targets designated at the operational level.

Having established what the operational level of war is and having outlined what operational fires are, it is appropriate to examine how and with what means the operational level commander in NATO can best execute his operational fires' responsibilities. For the purposes of explanation in this study, the CENTAG Commander (COMCENTAG) will be the operational level commander. Areas to be addressed will be targets.

weapons systems, target acquisition, organization, and command relationships.

CHAPTER II

TARGETS

One of the key elements in determining how the operational level commander is to accomplish his fire support responsibilities is the types of targets he will need to attack. An examination of the targets required to be attacked should indicate how the commander is to proceed. As mentioned above, FM 100-6 specifically addresses some types of targets that the operational level commander is interested in attacking. These include command and control centers, long range surface to surface missile systems, bridges, and air defense systems. Additionally, other types of targets include large, concentrated combat formations, airfields, logistical storage depots, communications installations, and rail road yards.

Basically, the operational level commander is concerned in attacking deep targets that will delay, disrupt and destroy enemy forces and critical facilities, thereby disrupting the enemy commander's timetable for flowing follow on forces into the battle area for commitment to combat operations. The operational level commander must be interested in attacking targets that exploit Soviet weaknesses such

as the Soviet system of centralized control, dependence on massed combat formations echeloned in depth, and an extensive logistical network to support these massive combat forces.¹⁴

By attacking Soviet command and control centers, the operational level commander would be neutralizing a key component in the system of rigid centralized control. Elimination of these critical installations would cause a degradation in the command of the Soviet combat forces, thus significantly reducing combat effectiveness. The Soviets control combat operations using a relatively inflexible and rigid command structure that does not allow subordinate commanders very much flexibility in execution of operations. It is a system that depends heavily on centralized direction from higher level headquarters. If the operational level commander can succeed in disrupting Soviet command and control, he can cause a significant loss of control over Soviet combat formations.

The Soviets rely heavily on communications systems to direct the actions of combat units. While it would be ideal to destroy command centers, attacking and destroying communications systems can have the same effect. Without a means of communicating orders and directions the capability of combat forces to conduct battle can be rapidly diminished. Because of the strong radiation signals emitted by communications

stations, it is often easier to locate and identify the communications center than it is to locate the command center it supports. By attacking the communications system, the operational level commander can effectively disrupt the functions of command and control, thereby disrupting the centralized control and direction of Soviet units.

In attempting to identify command centers and communications centers for attack, COMCENTAG would be interested primarily in Soviet army level and front level installations. Lower level headquarters units and communications centers would be the focus of the corps and division commanders interest; although if necessary, the operational level commander could attack these targets in support of a corps commander.

Because of the tremendous threat that enemy air power poses to friendly formations, enemy airfields are of great concern to COMCENTAG. In recent years the Soviet Air Force appears to be shifting emphasis from the air superiority role to the ground attack role. According to 'Soviet Power 1988,' since 1978 the number of front level and theater level ground attack regiments facing NATO has increased from 26 to 43.¹⁵ Enemy air forces can cause tremendous difficulty for the NATO commander by attacking various targets from front line combat units to rear area combat service support units.

The most effective way to deal with the air threat problem is to destroy enemy aircraft on the ground and to render enemy airfields unuseable. If this can be accomplished, the enemy air threat can be significantly reduced. Of course airfields can be easily located and identified for attack because they are impossible to conceal. While the NATO air forces play the leading roles in attacking enemy airfields, it is a very challenging mission for aircraft because of the heavy air defenses the Soviets normally emplace around air fields and number of interceptor aircraft the Soviets deploy. Attacks by ground based missile forces could very well complement attacks by aircraft because of the ability of missiles to penetrate air defenses.

A key to Soviet operational concept is the echelonnement of forces. Soviet commanders deploy forces in echelon formations at various levels of command which causes opponents to have to contend with combat forces following each other in the attack. The idea is that the defender will be defeated by the necessity of having to engage Soviet forces that relentlessly attack in successive waves or echelons. The defending forces will be overcome by the repetitive unrelenting attacks of assault echelon upon assault echelon resulting in a collapse of the defense

and a massive Soviet breakthrough designed to seize deep operational objectives.

To counter this concept, slow the Soviet attack and eventually stop the Soviets, NATO's operational doctrine includes the concept of Follow-on-Forces Attack(FOFA). FOFA outlines a concept that calls for operations to be conducted at the theater and operational level to disrupt, delay and destroy enemy follow on forces.^{1*} These enemy forces are those forces not directly involved in combat at the FLOT.

Consequently, the operational level commander is very interested in locating and attacking Soviet follow on forces that are positioned in depth. He wants to attack and destroy as many enemy formations as possible, as deep as possible, to prevent the enemy from deploying and committing these forces to combat in the main battle area. By attacking and disrupting enemy formations before they can be committed to the fight, COMCENTAG will enable tactical level commanders at the corps and division levels to have a much improved opportunity to defeat the enemy in the battle at the FLOT. If the operational level commander is not successful in preventing follow-on-forces from closing to the FLOT, the risk is very high that NATO forces will be unable to stop the enemy and may be subject to being defeated in detail. Because of the criticality to the overall outcome of the conflict,

enemy follow-on-forces, including Soviet echeloned forces, operational maneuver groups(OMG's), and reserve forces, may very well be the number one priority target for the operational level commander to attack.

Other targets that are of concern to the COMCENTAG are bridges, both fixed and mobile, as well as railroad bridges and yards. These targets are important because they are closely related to the follow-on-forces attack concept. For the Soviet commander to move his follow-on-forces forward in great numbers, he must depend on the transportation network. His reinforcing units must move on roads, across bridges, and, in some cases, by railroads. Likewise, the huge Soviet logistical forces required to support the combat units must move forward on the same transportation network. If the Soviet commander is denied the use of the transportation network, his reinforcement timetable will be disrupted, and he will have great difficulty reinforcing units in the main battle area.

With exception of Soviet mobile tactical bridging, the operational commander knows precisely the location of key road and railway bridges and railroad yards. These are fixed targets that can be pre-programmed for attack and destruction. The commander may very well want to attack these fixed transportation network

targets early in the conflict to deny use of the bridges and railroad yards by the enemy and to cause the enemy deploying forces maximum difficulty moving to the battle front.

Mobile bridging assets present a more difficult location and targeting problem. Likely locations of mobile bridge sites, particularly those on major water courses, can be determined before a conflict commences. Once a conflict has begun both national technical means and special operations forces can be employed to precisely determine where the enemy is actually installing mobile bridges. When the locations of such bridges is fixed, the operational level commander can choose to attack those bridges that are determined to be most critical to the enemy reinforcement effort. These bridges would most likely be located on such major south to north flowing water courses as the Elbe River, in Czechoslovakia and East Germany, and the Neisse and Oder Rivers, on the frontier between Poland and East Germany.

Soviet air defense missiles and surface to surface missiles, located at both the army and front levels of command, are targets of great concern to the operational level commander. The Soviets employ numerous types of surface to air missiles in significant numbers at all levels of command including the army and front levels. A key element in the

success or failure of the NATO ground campaign will be neutralization of the air defense threat. The attack and elimination of air defense missile systems will contribute significantly to the outcome of the conflict because it will enable NATO air forces to conduct counterair operations, battlefield air interdiction, and air interdiction operations in a less threatening environment. Failure to effectively deal with the air defense threat could very well lead to unacceptable NATO air force losses and eventual failure of the ground campaign. A concerted effort of both air to surface and surface to surface weapons systems will be necessary to neutralize the Soviet air defense threat in the theater.

The Soviets have three types of heavy surface to surface missile systems operational at both the army and front levels with ranges of 300 to 900 kilometers. While some of these missiles will be eliminated by the INF Treaty, remaining missiles will present a continuing threat. These missile systems are all capable of delivering conventional, chemical, and nuclear weapons and can be employed to attack NATO front line units as well as forces located in depth throughout the theater. These weapons are capable of inflicting great destruction on NATO forces in either a conventional, chemical or nuclear conflict. In discharging fire support responsibilities, the

operational level commander should attack these missile systems when they are located in his area of responsibility given the capability to do so.

It must be noted that all of these targets are not of equal importance all of the time. In some situations some targets will be of greater importance than others. The commander, based on the situation, and what he is attempting to accomplish, will set priorities for attack of certain targets in certain circumstances. For example, if the commander determines that he must focus his major effort, during a particular period of time, on attacking enemy reinforcements, he will make follow-on-forces the top priority for attack. Other types of targets, such as command centers and communications facilities would be of lesser priority. If at a later time the commander decides that attack of airfields has become a critical factor he will adjust his target priorities accordingly to make attack of airfields top priority.

TYPES OF TARGETS

- * Command and Control Centers
- * Communication Centers
- * Follow - on - Forces
- * Air Defense Weapon Systems
- * Bridges (road, rail, fixed and mobile)
- * Airfields
- * Railroad Yards
- * Logistical Storage Depots

CHAPTER III

WEAPONS SYSTEMS

For the COMCENTAG, or any other operational level commander, to have the ability to attack and defeat the types of targets discussed above, weapons systems must be available with which he can accomplish the required tasks. Presently, operational level commanders must depend almost exclusively on air delivered weapons or special operations forces to attack targets. Certainly there will be a continuing long term requirement for both air forces and special operations forces to attack targets at the operational level. However, in the first few days of war in Europe most air force fighter/bomber aircraft will be dedicated to fighting the extremely critical counterair battle. This is certainly a most proper role for the Air Force because winning the counterair battle is absolutely essential to defeating a Warsaw Pact invasion in the central region. With the exception of air strikes on enemy airfields as part of the counterair campaign, very few air sorties will be available for attacking other types of targets identified as required in the target section of this study. Many of these targets need to be attacked early in the conflict but currently no surface to

surface weapons systems are readily available to the operational level commander to execute his fire support responsibilities at the ranges required.

In attempting to determine what would be the best types of weapons for the operational commander to employ in a surface to surface role, an examination of the recently published report of The Commission On Integrated Long-Term Strategy provides some insight. This report emphasizes that the United States must take advantage of the precisely accurate, long range, smart munitions that are being developed, and deploy weapons systems capable of attacking targets at long range with precision accuracy. Current emerging technology can produce these types of weapons. These types of weapons make it possible to strike heavily defended point and area targets, either hard or soft, deep in enemy territory with precision and discrimination. With these precision weapons enemy airfields, command and control centers, bridges, railroads, and missile sites become increasingly vulnerable to successful attack.¹⁷

Advanced conventional weapons would better enable the NATO Alliance to implement its FOFA concept by attacking enemy formations in enemy rear areas in East Germany and Czechoslovakia before the units can maneuver and close into the main battle area and influence the outcome of the battle.¹⁸

NATO will need to have highly accurate nuclear weapons available for several reasons. The mere presence of the weapon will most likely discourage the enemy from massing forces out of concern that a nuclear attack would cause destruction of massed forces. The capacity to deliver closely controlled and precisely accurate nuclear strikes would effectively deter the Soviets from using their own nuclear weapons against NATO forces out of fear of retaliation. Lastly NATO must insure that its threat to employ nuclear weapons is primarily based on denial of success to the Soviet forces and not necessarily linked to certain nuclear escalation.¹⁸

Considering the doctrinal fire support requirements and the target engagement requirements, the operational level commander needs to have available both conventional and nuclear weapons systems that will provide him both the capability and the flexibility to accomplish required tasks.

If the operational level commander is to attack deep point targets with precision accuracy, there is a requirement for a weapon system capable of achieving a high degree of accuracy at operational ranges. To consistently attack deep point targets accurately, it is desirable to employ a terminally guided weapon as opposed to an inertially guided system, as it is very

difficult to achieve the accuracy desired using an inertial guidance system.

For purposes of explanation let us say the commander desires to use a guided missile to strike a key bridge spanning the Spree River in East Germany. The Soviets are using the bridge to move follow-on-forces forward toward the main battle area. In using an expensive asset, such as a missile, to strike this target COMCENTAG would want a high degree of assurance that the weapon would hit the bridge and destroy it. By employing a terminally guided weapon he would have a much higher degree of assurance than he could have using an inertially guided missile. The optimum degree of accuracy that can be achieved employing an inertial guidance platform is about a one mil measurement at maximum range. If the range to the bridge is 250 kilometers a one mil accuracy error can calculate to a miss distance of 250 meters, or one meter for every kilometer in range. Should the missile miss the bridge by a distance of 250 meters the probability of destroying it is rather remote, even using a large conventional warhead. A terminally guided system, capable of maneuvering on the decending trajectory, can consistently strike targets within a few meters at maximum ranges. Miss distances are consistently within 15 meters and normally these small errors can be attributed to target location errors

based on inaccuracies in mapping rather than guidance system errors.

Terminal guidance technology is presently available in an operational status with deployed United States military forces. It is not a technology that needs to be developed. The Army, Air Force, and Navy have forces operating weapons with terminal guidance systems. Sea, air, and ground launched cruise missiles and the Pershing II surface attack guided missile are types of existing weapons using terminal guidance. These weapons have proven to be very reliable and accurate at long ranges, over 1000 kilometers, in numerous operational tests. It is possible that no long term expensive research and development effort would be required to field terminally guided deep attack weapon systems for employment by the operational commander because the basic technology already exists. The process would be one of modification and adaption rather than a full scale developmental project.

Terminally guided weapons are certainly much more expensive than weapons using inertial guidance or free flight rocket systems because of the advanced technology and the expensive hardware associated with such systems. However, the age of terminal guidance and smart munitions has arrived, and this type of technology will increasingly become more prevalent in

military applications because it will give commanders additional capabilities to deal with the threat posed by the Soviet Union. Additionally, over the long-term, modern precision weapons may significantly reduce the number of soldiers required to operate weapon systems, resulting in increased savings rather than increased costs. Modern state of the art weapon systems, in which many functions are automated, require fewer soldiers to operate than do older weapons, that lack a high degree of sophistication. The Pershing IA missile system, for instance, required approximately 21 soldiers per battery to perform the azimuth laying specialist tasks associated with orienting the missile for direction. With the introduction of the more modern Pershing II system in 1983, the azimuth laying function was totally automated, and the requirement for the 21 azimuth laying specialists was eliminated resulting in a substantial manpower savings. One only needs to examine the manpower savings the Army has realized by deploying the multiple launch rocket system(MLRS) to understand the manpower cost savings that can be achieved by deploying modern weapon systems. An MLRS battery with nine launches and only three soldiers per launcher has effectively replaced the 203MM howitzer battalion, of over 500 soldiers, in all heavy divisions in the Army. Eventhough, the howitzers and

some of the soldiers were placed into corps artillery battalions, this represents a significant savings of both money and manpower. It is an excellent example of the savings that the fielding of modern weapon systems can produce.

This discussion of terminally guided systems is not to imply that there is no role for other types of guided weapon systems. There certainly is a role for area attack weapons using inertial guidance and warheads that dispense multiple submunitions over wide areas. These types of systems are suitable, as well as preferable, for attack of large enemy force concentrations, air fields, and other area type targets, such as a fuel tank farm storage area, where precision accuracy is not required to effectively engage the targets. These types of weapons are very effective for attack of large area targets that have many dispersed targets spread throughout the area. A good example of this type of target would be a follow-on-force Soviet motorized rifle regiment in an assembly area. The regimental assembly area would cover a relatively large piece of terrain and within that area would be numerous vehicle targets, both hard and soft, as well as numerous personnel targets. A surprise saturation attack of the area with the missile dispersed dual-purpose submunitions would result in

damage to vehicles and significant personnel casualties.

At the operational level, the Army tactical missile system(ATACMS), currently under development, may be a suitable type of weapon system to be used to attack large area targets. This system has been designed to be primarily a corps commander's weapon to be employed in the corps area of responsibility(AOR) enabling the corps commander to attack deep targets. One of the primary roles for ATACMS will be to attack Soviet second echelon units out to ranges in the neighborhood of 150 kilometers from the FLOT. This is a proper role for the system in order to provide the corps commander a deep strike capability.

COMCENTAG, while certainly interested in the corps AOR's, is looking deeper than 150 kilometers when considering attack of deep targets. It is not unlikely that he will be looking out to ranges of 300 to 400 kilometers trying to locate Warsaw Pact follow-on-forces and other critical targets that he wants to attack to influence the campaign at the operational level. Certainly if the ATACMS, or similar system, had the range capability to reach to the deep ranges mentioned above, it would be a suitable system for employment by the operational commander. However, as development of this system proceeds, it is not presently programmed for the ATACMS to achieve the

ranges necessary to engage targets at 300-400 kilometers. As currently being developed, ATACMS is unable to range deep into East Germany and Czechoslovakia to attack the key operational level targets described in the target section above. However, this does not mean that the ATACMS, as currently being developed, would have no role in COMCENTAG's operational fire support plans. This system could be used by the operational level commander to attack closer in targets within the ATACMS range capability. This aspect will be addressed in the organization and command relationships portion of this study.

In attempting to satisfy the operational level commander's need to have a surface to surface weapon system available to attack a variety of targets it is necessary to describe what the basic characteristics and capabilities of such a system should be. Basically, the weapon needs to be capable of attacking effectively the types of targets identified in the listing on page 17. As was alluded to above, range is a primary characteristic because the operational level commander needs a weapon capable of operating across a range spectrum that will provide him the ability to strike targets located throughout his area of responsibility. If, for example, he wants to attack bridges on the Elbe River in the vicinity of Dresden,

East Germany, to prevent follow-on-forces from expeditiously moving forward, the ranges from possible launch point in the CENTAG AOR are from about 250 kilometers to approximately 400 kilometers. If the bridges on the Oder or Niesse Rivers, further to the East, were to be attacked the distance would increase to the 350 kilometer to 450 kilometer range. These ranges also consider a standoff distance of the launch points from the FLOT. If the missile launch points move rearward due to forward movement of the enemy, the target ranges will increase correspondingly.

At this juncture of time, because of the almost certain implementations of the INF Treaty, any missile system deployed must be limited to a range of 500 kilometers or less. This range restriction applies to both nuclear and conventional weapons. Based on this limitation, the positioning of the CENTAG AOR and the enemy targets that will most likely be attacked, a weapon range of 500 kilometers is desirable. This range provides the commander the maximum range capability to engage targets deep in the enemy rear area, across the wide CENTAG front and also complies with the provisions of the INF Treaty. Additionally, a range of 500 kilometers will contribute to maximizing the deterrent effect of the weapon system. This should be a primary consideration.

The type of guidance system to be utilized is a critical weapon characteristic. As was discussed earlier, the type of guidance system needed for desired warhead delivery depends, to a significant degree, on the type of target being attacked. If attacking a point target of high value, such as a command and control center, a terminally guided system is desirable because of the precision accuracy required. If the target is a large logistical staging area then an inertially guided weapon will most probably provide the necessary degree of accuracy to successfully attack the target. Because of the wide variety of targets that the operational level commander is concerned with, spread over a large range spectrum, consideration should be given to providing him a missile system that is capable of using either terminal guidance or inertial guidance. The type of guidance would be based on the type of target being attacked. Just as missile units maintain different types of warheads designed for attack of various types of targets, units would have two types of guidance and control sections on hand for use on missions against point and area targets.

While this arrangement would give the commander flexibility in selecting the needed type of guidance control for a particular mission and perhaps achieve cost savings over the long-term, there are certain

drawbacks. Obviously, the delivery units would be required to transport and maintain a significant additional number of guidance and control sections. Also, the soldiers may have to frequently change guidance sections, as dictated by changing mission requirements, and this could complicate the delivery of missile strikes.

The primary reason for suggesting such a dual guidance system approach is to reduce the cost of employing expensive terminal guidance systems on each and every missile when in some instances inertial guidance would suffice. If it is decided that cost savings is not the key factor, then the best approach would be to have only one type of guidance and control system that uses terminal guidance but can also be used in the inertial mode if necessary. This type of guidance system is currently in use in the Pershing II missile system and therefore development costs would be minimal.

For the commander to be able to effectively attack targets he needs different types of warheads to attack different types of targets. As previously mentioned both nuclear and conventional warheads are required. Nuclear weapons are necessary for two reasons. First of all to provide for the highest possible level of nuclear deterrence in NATO, particularly during a period of time when a significant degradation of

deterrance will occur with implementation of the INF Treaty. Secondly, nuclear weapons are necessary to provide the commander the highest level of capability and flexibility necessary to repel a massive Soviet attack if our conventional forces are unable to stop the aggression and a decision is made by the National Command Authority(NCA) to employ nuclear weapons. The nuclear yields of these weapons should be as large as needed to assure target destruction, yet small as possible to limit collateral damage.

Several types of conventional warheads should be available to attack different types of targets. To attack hard point targets, such as a well dug in command center, a warhead armed with a large conventional high explosive device would be desirable. This warhead should have a penetration capability, such as an earth penetrator and delayed fusing capability, to enable it to penetrate through fortified bunkers and detonate underground causing maximum damage to well bunkered facilities. This type of warhead would also be suitable for attacking bridges where the object is to concentrate maximum explosive power on a rather small area in order to cause destruction. Another potential use of this type of weapon would be to create large craters in airfield runways and in railroad switching yards. Warheads containing explosive submunitions can be very

effective against large area targets such as those addressed earlier. These warheads can deliver anti-personnel and anti-armor submunitions.

In summation, a surface to surface weapon system to be employed by the operational level commander should be a guided missile. It should have both terminal and inertial guidance capability depending on the type of target being attacked. Also, the missile should have a range of 500 kilometers to provide commanders a maximum range spectrum in which to attack suitable targets and to keep the level of deterrence as high as possible in NATO during the post INF period.

Finally, the system should have both conventional and nuclear capability in order to maximize the deterrent effect and to effectively attack and defend targets in both conventional and nuclear war should armed conflict occur.

CHAPTER IV

TARGET ACQUISITION

If the operational level commander is to succeed at engaging deep targets he must have reliable target acquisition means available to aquire targets and determine exact location. For deep, precision, surface to surface missile strikes to be effective, it is imperative that targets be accurately located and properly identified. As was addressed in a previous

example, when engaging targets at long ranges, a small target location error translates into a rather significant target miss distance. Currently the operational level commander has very little target acquisition means available for employment. Just as he must depend on air power almost exclusively to attack deep targets, he must depend on target acquisition assets not under his control to locate targets.

This is not to suggest that target acquisition assets must be placed exclusively under the direct control of the operational level commander. Rather, the commander needs to have access to target acquisition assets to provide timely target information. Basically, he needs to have access to target acquisition means that will locate both fixed and mobile targets so decisions can be made concerning which targets to attack and when to attack them. While consideration could be given to providing dedicated assets to the COMCENTAG, the real issue is a matter of having the ability to gain access to the information produced by target acquisition assets and to provide direction as to where and when target acquisition assets should be oriented looking for targets. If, for instance, COMCENTAG requires a current update on Warsaw Pact military airfields in East Germany and Czechoslovakia, he needs to be able

to request some type of target acquisition means to orient on the airfields and provide the updated information.

Currently, there are means available that can provide target acquisition support to COMCENTAG in locating and identifying deep, fixed targets. COMCENTAG can receive support from the 4th Allied Tactical Air Force which has airborne target acquisition platforms available in the RF-4C aircraft. The RF-4C is a multi-sensor reconnaissance version of the F-4C Phantom II fighter. The aircraft is capable of producing tactical photographs in all types of weather both day and night using forward-looking and side-looking optical cameras and infrared(IR) sensors. These aircraft are also equipped with side-looking airborne radar(SLAR) and a tactical electronic reconnaissance system(TEREC) for locating electronic emitters. Both the SLAR and the TEREC have a down link capability to produce near real-time information. With a range of over 2000 miles and the capability to fly low-level at high speeds, the aircraft can penetrate deep into enemy territory and can be a very capable target acquisition asset, particularly for locating and identifying deep, fixed targets.²²

Another airborne system presently available in Europe is the high altitude TR-1A tactical reconnaissance and target acquisition aircraft. This

aircraft is a standoff system employing an advanced synthetic aperture radar device to provide all weather day and night surveillance in support of allied ground and air forces.²¹ While many of the TR-1A's capabilities are classified, the system is capable of looking deep in enemy territory using its sophisticated radar and its ability to operate at altitudes in excess of 70,000 feet for long periods of time. While the aircraft will certainly have priority missions assigned in support of various commanders, it is an existing low-density asset that could be employed in support of the operational level commander in locating deep targets.

The Army and the Air Force are currently developing the joint surveillance target attack radar system(JSTARS). This system, which is an airborne system similar to the Air Force airborne warning and control system(AWACS), is being designed to locate deep targets for commanders from the division through the theater levels. Although many of the performance capabilities of this system are classified it will be capable of covering an area 480 kilometers long by 380 kilometers deep beyond the FLOT. JSTARS will be capable of locating multiple mobile targets simultaneously employing a sophisticated radar system. The system will have automatic, real-time down link capability with ground support modules(GSM's)

positioned with ground force command and control headquarters and fire support delivery units.²²

The JSTARS will do for the land battle what AWACS has done for the air battle. The system will be capable of locating and identifying the deep moving targets that COMCENTAG needs to attack to execute his operational level fire support responsibilities. JSTARS will be particularly effective in locating both moving and stationary enemy follow-on-forces.

Presently, COMCENTAG has very little capability to locate these targets in depth and therefore there exists a critical need for such a target acquisition system. Positioning JSTARS GSM's at both the CENTAG Main Operations Center and missile firing units that may be supporting the army group, would provide a superb target acquisition capability to COMCENTAG.

The JSTARS is the single most important target acquisition system being developed to provide a real time, deep target identification capability to field commanders, and it will give the operational level commander the capability to see deep and locate, precisely, critical targets for attack.

There are several other means that could be used to provide target acquisition support to the operational level commander. These include surveillance satellites, which can produce photographic imagery and mapping information on deep targets, and the Army

Guardrail and Quick Look airborne system that can provide locations of enemy communications emitters and non-communications emitters, respectively. These two systems are currently deployed in support of the corps commander, but they could be used to support the operational level commander as well, providing information related to close in targets that the operational commander may wish to attack. Another system also deployed at the corps level is the Mohawk surveillance system. This airborne system is capable of producing radar imagery and both infrared and photo imagery. Information produced by this system could also be used by COMCENTAG for targeting suitable targets located close-in in the corps AOR.

In the emerging technology arena, research and development in the so called unmanned aerial vehicles may, in the near future, provide another practical target acquisition means to the field commanders. These remotely piloted vehicles, employing real time video imagery, electronic intelligence gathering capability, and laser designation capacity, will penetrate deep into enemy territory and provide valuable target information to operational level commanders.

To properly discharge his fire support responsibilities the operational level commander must have timely, accurate target information available.

Presently, resources to accomplish this critical task are limited. However the development and deployment of systems such as the JSTARS will significantly enhance the capability to acquire the necessary information concerning deep targets throughout the operational level commander's AOR.

CHAPTER V

ORGANIZATION and COMMAND RELATIONSHIPS

If COMCENTAG, or any operational level commander, is to have responsibility for operational fire support, consideration must be given to making organizational or force structure changes to provide a suitable organization for accomplishing the fire support mission. This section will discuss a proposed organizational structure that could be instituted in CENTAG to facilitate accomplishment of the mission and command relationships. Previous discussion has centered on the types of targets to be attacked, the types of weapons to be used to attack targets and the target acquisition means to acquire and locate targets. Beyond these considerations the commander needs some type of a fire support coordination agency to accomplish the necessary coordination for effective target engagement and a weapon delivery organization capable of delivering effective strikes on designated targets.

Commanders at both corps and division levels have a designated fire support coordination agency called the fire support element(FSE), which is responsible for all types of fire support coordination. This includes not only field artillery fires but air delivered fires and naval gunfire support. The FSE is a critical and fully integrated entity of the battle staffs at the corps and division. The FSE's are there to assist commanders in exercising fire support coordination responsibilities. As was addressed previously in the doctrinal discussion of terms, the operational level commander has operational fires responsibilities that are rather specific that require coordination tasks to be accomplished, yet COMCENTAG has no FSE, as such, to perform the fire support coordination function. It could be argued that, prior to COMCENTAG assuming a role in the realm of operational fires, there was no need for an FSE. Now, however, with the expanded involvement at the operational level, perhaps there is a need for an FSE or similar fire support coordination organization.

At CENTAG headquarters the intelligence and operations personnel function under the deputy chief of staff for intelligence(G-2) and the deputy chief of staff for operation(G-3), respectively. Within the G-2/G-3 operations there are two joint activities established with the 4th Allied Tactical Air Force

(4ATAF). These activities consist of collocated attack branch of 4ATAF that interface with the G-3 air and a target intelligence branch of 4ATAF that interfaces with the G-2. The primary function of these joint activities are target identification and coordination of the delivery of air strikes in support of COMCENTAG. There is no agency within the staff designated to be responsible for the overall coordination of all types of fires, including surface to surface fires.

General Hans Hemming von Sandrart, the commander-in-chief, Allied Forces Central Europe, recently expressed his concern for army group fire support coordination. Writing in Military Review he stated, "The army group must be in a position to coordinate the use of long range corps weapon systems across corps boundaries and beyond the corps areas of responsibility."²³ General von Sandrart has good reason for concern based on two reasons. First, the army group presently would have a very difficult challenge attempting to accomplish detailed fire support coordination because the army group headquarters is not properly staffed to perform the required coordination tasks. Second, as previously addressed, the corps does not have any long range surface to surface weapons systems with which it could engage any targets beyond its area of responsibility.

Actually the corps does not currently have any long range system that can engage targets out to the limits of its AOR with the exception of air delivered weapons.

As discussed earlier, two general tasks to be accomplished through the application of operational fires are, isolation of the battlefield and destruction of enemy forces. These tasks cannot be accomplished in a vacuum. They must be achieved in close coordination with the overall operational scheme to insure that all combat actions are well synchronized. Through proper synchronization of action, COMCENTAG will endeavor to generate the necessary combat power required to stop the enemy's advance and eventually defeat his forces. There certainly appears to be a need for establishment of a fire support coordination agency at the CENTAG headquarters to properly coordinate the operational fires function.

There are numerous specific tasks that an army group fire support coordination agency would perform. The agency would develop army group fire support plans, particularly for employment of fire support weapon systems available to the army group. It would be responsible for advising COMCENTAG on matters of operational level fire support and recommending how to best organize for combat available fire support

assets. Additionally, this agency would recommend priorities for employment of CENTAG fire support assets and maintain the current status of fire support systems available for employment by the army group. A major role would be to coordinate and deconflict CENTAG surface to surface missile strikes with 4ATAF, NORTHAG and the army group's corps, as necessary. This needs to be accomplished to avoid possible target engagement conflicts, duplication of target strikes or the possibility of not striking critical targets when needed. If COMCENTAG is to properly execute operational fire support responsibilities, in synchronization with the overall battle, he needs a fire support coordination agency to accomplish the required tasks.

If COMCENTAG is to properly execute his operational level fire support tasks, he needs a delivery unit, or units, available that are responsive to his requirements for delivery of strikes on specific targets within designated time parameters. Ideally, these units would be under the direct command of COMCENTAG and, therefore, directly responsive to his mission requirements. A proposed organization could be an army group field artillery command. Such an organization could consist of a command headquarters, a number of surface to surface missile firing battalions, a signal battalion, and a support

battalion. The command headquarters would provide for the necessary overall command and control of the organization and serve as the command and control interface with CENTAG headquarters. It would work very closely with the fire support coordination agency at CENTAG headquarters. The missile firing battalions would be responsible for the delivery of missile strikes against targets designated by CENTAG. The signal battalion would provide required communications links needed for establishment of communications within the command. The support battalion would be responsible for providing logistics and maintenance support to all elements of the organization.

If it was decided that the number of missile firing battalions in the command would be three or four, then the above outlined organizational structure would probably suffice. However, if a need is identified for a command consisting of more than four firing battalions, consideration would need to be given to including brigade level headquarters in the structure to exercise command and control. Under these circumstances the proposed organization would have a command headquarters and two missile brigade headquarters, each exercising command and control over two or three missile firing battalions. The command signal battalion and the support battalion would have to be enlarged to provide for the additional

communications and support requirements created by addition of the brigade headquarters units and the missile firing battalions.

Another option for the delivery of operational fires could be to have COMCENTAG employ delivery systems located in corps level field artillery battalions. Assuming that these units were armed with weapon systems having the required range to strike deep targets beyond 150 kilometers, COMCENTAG could exercise control by issuing orders and guidance to corps commanders concerning the employment of the missile systems. COMCENTAG could direct that certain units, under the command of the corps, be dedicated exclusively to executing only those missile strikes directed by CENTAG in support of CENTAG operational level fire plans. The numbers required for this exclusive dedication would be predicated on COMCENTAG's needs. If it is not necessary to exercise this strict type of control, COMCENTAG could simply direct the corps to maintain a certain number of missile sorties, i.e. 25 per day, available for strikes, on order, against COMCENTAG generated targets. Additional measures outlined in Field Manual 6-20, Fire Support in Combined Arms Operations, could be used by COMCENTAG to insure that delivery units would be readily available to execute CENTAG missions. Examples of such measures would be establishing a

restrictive controlled supply rate(CSR) on ammunition which allocates only a certain percentage of available missile ammunition for expenditure against corps generated targets or assignment of a non-standard tactical fire support mission which directs corps units to respond to calls for fire from CENTAG as a number one priority.

There are certain advantages in having the missile delivery units directly under the control of CENTAG. In this arrangement COMCENTAG is assured that the most responsive command environment has been emplaced. Units directly under the operational command and control of CENTAG can provide the most responsive fire support to the army group, whereas if COMCENTAG has to call on the corps to provide the support, it will be less responsive. Also, by not placing CENTAG mission requirements on corps assets, COMCENTAG does not have to be concerned that he is drawing much needed fire support assets away from the corps commanders. By having a dedicated fire support delivery unit directly under his command COMCENTAG is in the best position to discharge his operational level fire support responsibilities. Another advantage is having the field artillery command headquarters available to establish a field artillery command post that functions as the CENTAG force artillery headquarters. This headquarters would be of great assistance to

COMCENTAG in accomplishing the operational level fire support tasks.

The major disadvantage of the dedicated army group field artillery command is the matter of resources. This command would be a resource intensive organization requiring a significant number of soldiers and a large amount to expensive equipment, costing a substancial amount of money. Considering the combat power potential of the organization, and the deterrent value gained, it can be argued that capability of such a unit is well worth the cost. An existing potential source of both personnel and equipment for an army group field artillery command could be the 56th Field Artillery Command(Pershing) presently forward deployed in the Federal Republic of Germany. This unit will most likely be disestablished as a result of implementation of the INF Treaty. The command has approximately 6,200 soldiers assigned and it has various types of relatively new equipment. Perhaps both personnel spaces and equipment from the Pershing command could be used to resource a good portion of an army group field artillery command.

In planning to deliver operational level fires throughout the CENTAG AOR, COMCENTAG may decide to attack certain targets that are located in the corps AOR's and within the range of corps delivery systems, such as the ATACMS. An example of this would be the

attack of a large enemy follow-on-force located approximately 100-125 kilometers from the FLOT. In this circumstance, COMCENTAG may choose to have corps ATACMS attack the enemy force, withholding his own missile systems for the attack of deeper targets. This could be accomplished using control measures previously described, such as a restrictive CSR or the issuance of written instructions to the corps commanders directing them to be prepared to attack operational level targets on order of COMCENTAG.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

As a result of this study the following conclusions are drawn:

1. The operational level commander has a critical role and key responsibilities in the execution of operational fires in support of the overall campaign plan, and this role is expanding.
2. In the post INF period, NATO forces in Europe should be armed with a weapon system capable of delivering both conventional and nuclear warheads to ranges of 500 kilometers with precision accuracy to increase both conventional and nuclear force capabilities, and to maintain the highest possible level of deterrence.

3. Currently, and during the initial stages of hostilities, the operational level commander must depend almost exclusively on air force aircraft, employing air delivered weapons to attack deep operational level targets. He has no surface to surface weapon system available to attack deep targets at operational depths.

4. The operational level commander should have a precisely accurate surface to surface weapons system available for employment in his AOR that is capable of delivering conventional and nuclear warheads against a variety of targets over a broad range spectrum.

5. The operational level commander must have access to target acquisition systems that will provide the necessary target location and identification information so informed target attack decisions can be expeditiously taken.

6. The doctrinal changes in operational level fire support, as addressed in FM 100-6, will cause the operational level commander to have an increasingly significant impact on warfighting at the operational level, thereby affecting the overall outcome of a campaign.

The following recommendations are made based on the research performed in preparing this paper, the

conclusions reached as a result of this study project and the professional military judgement of the author:

1. The United States, in concert with its NATO Allies, should develop and deploy in NATO Europe a surface to surface missile system employing both terminal and inertial guidance systems. The system should have a maximum range of 500 kilometers and be capable of delivering both conventional and nuclear warheads. The purposes of the system would be to provide a weapons system for the operational level commander to employ in executing his operational level fire support mission and to maintain the highest possible degree of deterrence in the minds of the leadership of the Soviet Union.
2. The Army and the Air Force should continue with full scale development and eventual production of the joint surveillance target attack radar system (JSTARS) and insure that operational level commanders, as COMCENTAG, have ready access to the real time targeting information produced.
3. The Army should organize a surface to surface field artillery missile command and place it under the command of the Commander-in-Chief United States Army, Europe during peacetime and under the operational command of COMCENTAG in wartime. This missile command would provide

COMCENTAG with the best possible missile delivery organization for execution of his operational level fire support responsibilities.

4. The Army should organize a fire support coordination agency at the CENTAG headquarters to provide COMCENTAG with the capability to adequately perform the fire support coordination tasks associated with his operational level fire support responsibilities. This agency could be similar to the FSE found at the corps level.

ENDNOTES

1. James L. Binder, and Phillip J. Fick, and Eric C. Ludvigen, "Senate Hearings Assess INF Treaty Impact on NATO." Army The Magazine of Landpower, March 1988, p.22.
2. Ibid., p.25
3. George C. Wilson, "U.S. Should Build New Missiles for Europe to Offset Treaty General Says," Washington Post, 23 January 1988, p.A21.
4. Helen DeWar, "Carlucci Hits Attack on NATO Plans," Washington Post, 2 February 1988, p.A4.
5. Peter Grier, "Pentagon Draft Plans for Smarter Weapons," Christian Science Monitor, 29 February 1988, p.3.
6. U.S. Department of the Army, Field Manual 100-5, p.10. (Hereafter referred to as "FM 100-5").

7. U.S. Army Command and General Staff College, Field Manual 100-6, pp. VI-VII, (Hereafter referred to as 'FM 100-6').
8. 'FM 100-5,' pp.16,17.
9. 'FM 100-6,' p.3-7
10. Ibid.,p3-13
11. 'FM 100-5,' pp.19,20.
12. 'FM 100-6,' pp.3-1,3-16.
13. Ibid., p.3-17.
14. Raphael Hallada, 'Field Artillery Vision: Master Plan for Fire Support of the Future,' Field Artillery, February 1988, p.7.
15. Casper W. Weinberger, 'Forces for Theater Operations,' Soviet Military Power, March 1987, pp.67.
16. U.S. Army War College, 'Follow-on-Forces Attack,' NATO Armed Forces Reference Text, 16 February 1988, pp.30-32.
17. Fred C. Ikle and Albert Wohlstetter, 'Discriminate Deterrence,' Report of the Commision on Integrated Long-Term Strategy, January 1988, p.50.
18. Ibid., pp.29-30.
19. Ibid., p.30.
20. 'Reconnaissance and Special Duty Aircraft,' United States Air Force Almanac, May 1987, p.174.
21. Ibid., p.174.
22. Kent S. Sanderson, 'Joint Stars Look Deep to Win,' Field Artillery, February 1988, pp.25-26

23. Hans Henning von Sandrart, 'Considerations of the Battle in Depth,' Military Review, October 1987, p. 12.

BIBLIOGRAPHY

1. Binder, James L., and Fick, Phillip J., and Ludvigen, Eric C., 'Senate Hearings Assess INF Treaty Impact on NATO.' Army the Magazine of Landpower, Vol. 38, March 1988, pp. 16-29.
2. DeWar, Helen, 'Carlucci Hits Attack on NATO Plans.' Washington Post, 2 February 1988, p. A4.
3. Grier, Peter, 'Pentagon Drafts Plans for Smarter Weapons.' Christian Science Monitor, 29 February 1988, p. 3.
4. Hallada, Raphael J., 'Field Artillery Vision: Master Plan for Fire Support of the Future.' Field Artillery, Vol. PB6-88-1, February 1988, pp. 5-13.
5. Ikle, Fred C., and Wohlstetter, Albert, 'Discriminate Deterrence.' Report of the Commission on Integrated Long-Term Strategy. January 1988, pp. 29-51.
6. 'Reconnaissance and Special Duty Aircraft.' United States Air Force Almanac, Vol. 70, May 1987 pp. 174-175.
7. Rogers, Bernard W., 'Follow-On-Forces Attack (FOFA): Myths and Realities.' NATO Review, Vol. 32, December 1984, pp. 4-10.
8. Sanderson, Kent S., 'Joint Stars Look Deep to Win.' Field Artillery, Vol. PB6-88-1 February 1988 pp.25-27.
9. U.S. Army War College, 'Follow on Forces Attack,' NATO Armed Forces Reference Text, 16 February 1988, pp. 30-33.
10. U.S. Department of the Army, Field Manual 6-20: Fire Support in Combined Arms Operations. Washington: 31 December 1987.
11. U.S. Department of the Army, Field Manual 100-5: Operations. Washington: 5 May 1986.
12. U.S. Army Command and General Staff College, Field Manual 100-6: Large Unit Operations. Fort Leavenworth: 30 September 1987.
13. von Sandrart Hans Henning, 'Consideration of the Battle in Depth.' Military Review, Vol. 67, October 1987, pp. 8-15.

14. Weinberger, Casper W., "Forces for Theater Operations." Soviet Military Power. Sixth Edition, March 1987, pp. 66-67.

15. Wilson, George C., "U.S. Should Build New Missiles for Europe to Offset Treaty General Says." Washington Post, 23 January 1988, p. A21.

